



UNITED STATES PATENT AND TRADEMARK OFFICE

Art Unit: 3753)
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Examiner: J. Rivell)
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Applicant(s): Robert A. Roth)
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Serial No.: 09/992,079)
)
Filing Date: November 19, 2001)
)
For: CHECK VALVE FOR FUEL PUMP)
_____)

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

By Notice of Appeal filed April 22, 2005, Applicant has appealed the Final Rejection dated December 8, 2004 and submits this brief in support of that appeal.

REAL PARTY IN INTEREST

The real party in interest is the Assignee, Delphi Technologies, Inc.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences regarding the present application.

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STATUS OF CLAIMS

Claims 1 through 10 and 16 have been canceled.

CERTIFICATE OF MAILING: (37 C.F.R. 1.8) I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service with sufficient postage as First Class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on July 22, 2005, by Daniel H. Bliss
Daniel H. Bliss

Claims 11 through 15 and 17 through 20 have been rejected.

Claims 11 through 15 and 17 through 20 are being appealed.

STATUS OF AMENDMENTS

An Amendment under 37 C.F.R. 1.116 was filed on February 8, 2005 to amend claims 11 and 19. The Amendment under 37 C.F.R. 1.116 was acted upon by the Examiner and an Advisory Action was issued on February 28, 2005. In the Advisory Action, the Examiner indicated that the Amendment under 37 C.F.R. 1.116 had been considered, but did not place the application in a condition for allowance, and would be entered upon filing an appeal. A Notice of Appeal was filed on April 22, 2005, appealing the rejection of claims 11 through 15 and 17 through 20.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The claimed subject matter is directed to a fuel pump including an outlet member having a first passageway therethrough. [The fuel pump 12 includes a pump section 14 at one axial end, a motor section 16 adjacent the pump section 14 and an outlet section 18 adjacent the motor section 16 at the other axial end. The outlet section 18 has an outlet member 20 extending axially with a passageway 22 extending axially therethrough.] (Figure 1; Specification, page 5, line 19 through page 6, line 2).

The fuel pump also includes a valve housing disposed in the first passageway of the outlet member. [The check valve 10 includes a valve housing 26 extending axially and disposed in the passageway 22 of the outlet member 20.] (Figures 1 through 3; Specification, page 6, lines 12 through 14).

The fuel pump includes a valve seat formed on an interior surface of said valve housing and having a generally frusta-conical cross-sectional shape. [The check valve 10 includes a valve seat 34 disposed at the other end of the valve housing 26. The valve seat 34 is formed on the body portion 28 and has a generally frusta-conical cross-sectional shape.] (Figures 1 through 3; Specification, page 6, line 24 through page 7, line 2).

The fuel pump also includes a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end and including a seal disposed in the groove. [The check valve 10 also includes a valve member 36 disposed within the valve housing 26 and cooperating with the valve seat 34. The valve member 36 also includes an annular groove 46 at the other end thereof. The check valve 10 includes a seal 48 disposed in the groove 46 of the valve member 36. The seal 48 is of an o-ring type and is generally circular in shape with a generally circular cross-sectional shape.] (Figures 1 through 3; Specification, page 7, line 9 through page 8, line 4).

The valve member has a closed position in which the seal engages the valve seat to prevent fuel from flowing through the outlet member and an open position to allow fuel to flow through the outlet member. [The valve member 36 has a first or closed position in which the seal 48 engages the valve seat 34 to close the passageway 30 as illustrated in FIG. 2. The valve member 36 has a second or open position in which the seal 48 disengages the valve seat 34 to open the passageway 30 as illustrated in FIG. 3.] (Figures 1 through 3; Specification, page 8, lines 7 through 12).

The fuel pump includes a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward

the valve seat. [The check valve 10 further includes a spring 50 to urge the valve member 36 toward the valve seat 34. The spring 50 is disposed in the cavity 32 of the valve housing 26 and about the valve member 36 between the enlarged portion 44 of the valve member 36 and a shoulder 52 of the valve housing 26. The spring 50 urges the valve member 36 and seal 48 to engage the valve seat 34 in a closed position.] (Figures 1 through 3; Specification, page 8, line 19 through page 9, line 2).

The valve member has a single outlet port disposed below the groove and located axially between the valve seat and the one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow when the valve member is in the open position. [The valve member 36 has a body portion 38 that is generally tubular in shape and has a generally circular cross-sectional shape. The body portion 38 extends axially and has a cavity or flow port 40 extending axially into one end thereof. The body portion 38 also has a single aperture or outlet port 42 extending diametrically therethrough and communicating with the flow port 40. In the open position, the valve member 36 allows fuel to flow through the outlet port 42. Fuel flows past the valve seat 34 and seal 48 through the passageway 22 of the outlet member 20 to the conduit.] (Figures 1 through 3; Specification, page 7, lines 12 through 19; Specification, page 9, line 23 through page 10, line 1).

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The ground of rejection to be reviewed on appeal is whether the claimed invention of claims 11 through 15 and 17 through 20 are obvious and unpatentable under 35 U.S.C. § 103 over Hutchings (U.S. Patent No. 2,206,356) in view of Gimby (U.S. Patent No. 4,938,254), Feinberg (U.S. Patent No. 3,234,959), and Gakenholz (U.S. Patent No. 3,936,243).

ARGUMENT

Claims Not Obvious or Unpatentable Under 35 U.S.C. § 103

As to patentability, 35 U.S.C. § 103 provides that a patent may not be obtained:

If the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Id.

The United States Supreme Court interpreted the standard for 35 U.S.C. § 103 in Graham v. John Deere, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). In Graham, the Court stated that under 35 U.S.C. § 103:

The scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined. 148 U.S.P.Q. at 467.

Using the standard set forth in Graham, the scope and content of the prior art relied upon by the Examiner will be determined.

As to the primary reference applied by the Examiner, U.S. Patent No. 2,206,356 to Hutchings discloses a check valve. A valve casing 6 is provided at each end with screw threads to receive an outer member 7 of the unions whose inner members 8 are screwed to the end of pipes 9. A movable valve is constructed of a tubular portion 11 which is made to freely slide in a hole 12 provided in a valve cage 12 which has on one end an outwardly extending flange 14 tightly clamped between the inner member 8 of the union and the end of the valve casing 6. The other end of the valve cage 13 is provided with a valve seat 15 arranged to be engaged by a valve

cap 16 rigidly secured to the one end of the tubular portion 11 being provided with a shoulder 17 to serve as a stop against the one end of the valve cage 13. A plurality of holes 19 are shown through the tubular portion 11 a considerable distance from the valve cap 16 and fibre washer 20 which form a free passage for the fluid within the tubular portion 11 to enter the interior of the valve casing 6 when the valve is in a considerable open position.

As to the secondary reference applied by the Examiner, U.S. Patent No. 4,938,254 to Gimby discloses an over-pressure relief valve. A fuel valve 10 has a valve member 12 which is positioned within the opening O and which is reciprocable within the opening O along the central axis of the opening O. The valve member 12 has a first end 14, which is positioned adjacent to an outside face of the vessel V, and a second end 16, which is positioned within the vessel V. The valve member 12 has a part toroidal recess 18 positioned adjacent to the first end thereof, and the valve member 12 carries an elastomeric O-ring 20 which is retained in the recess 18.

As to the tertiary reference applied by the Examiner, U.S. Patent No. 3,234,959 to Feinberg discloses a checking valve device. A valve has a casing 10 and a pair of tubular coupling members 14,15 screwed into access openings 12,13 of the casing 10. A pair of tubular sleeve members 28,29 is positioned within the casing 10 before the coupling members 14,15 are screwed in place. A pair of fluid discharge orifices 35,36 is formed in the side walls of the sleeve members 28,29 upwardly from the closed ends of those members to provide separate fluid passages through the valve.

As to the fourth reference applied by the Examiner, U.S. Patent No. 3,936,243 to Gakenholz discloses a fuel pump. The pump includes an open ended first tubular housing part 10 engaged within an oppositely facing open ended second tubular housing part 11. The second

housing part 11 abuts against a collar 10a of the first housing part 10 and is secured thereto. The first part 11 tapers at its other end forming a frusto conical portion 12 and it terminates in a tubular extension 13. Extension 13 and first housing part 10 carry respective bearings 14 and 15, in which an armature shaft 16 of an electric motor is mounted. Shaft 16 carries an armature 17 and an armature winding. A valve 29 is provided in a flange fitting 33 of the housing member 10 which also carries the electrical connections for the electric motor.

Claims 11 through 15, 17, and 18

Independent claim 11 claims the present invention as a fuel pump including an outlet member having a first passageway therethrough and a valve housing disposed in the first passageway of the outlet member. The fuel pump also includes a valve seat formed on an interior surface of the valve housing and having a generally frusta-conical cross-sectional shape. The fuel pump includes a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end and including a seal disposed in the groove. The valve member has a closed position in which the seal engages the valve seat to prevent fuel from flowing through the outlet member and an open position to allow fuel to flow through the outlet member. The fuel pump further includes a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat. The valve member has a single outlet port disposed below the groove and located axially between the valve seat and the one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow when the valve member is in the open position.

The United States Court of Appeals for the Federal Circuit (CAFC) has stated in determining the propriety of a rejection under 35 U.S.C. § 103, it is well settled that the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). The law followed by our court of review and the Board of Patent Appeals and Interferences is that “ [a] prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.” In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (CCPA 1976). See also In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) (“In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification.”)

As to the differences between the prior art and the claims at issue, the primary reference to Hutchings ‘356 merely discloses a check valve having a plurality of holes through a tubular portion a considerable distance from a valve cap and a fibre washer which forms a free passage for the fluid within the tubular portion to enter the interior of a valve casing when the valve is in a considerable open position. Hutchings ‘356 lacks a valve housing adapted to be disposed in an outlet member of a fuel pump and a valve seat formed on an interior surface of the valve housing and having a generally frusta-conical cross-sectional shape. Hutchings ‘356 also lacks a valve member having a single outlet port to allow flow from the valve member when the

valve member is in the open position. In Hutchings '356, a valve casing 6 is provided at each end with screw threads to receive an outer member 7 of the unions whose inner members 8 are screwed to the end of pipes 9 and a movable valve is clamped between the inner member 8 of the union and the end of the valve casing 6 and not disposed in an outlet member of a fuel pump.

Gimby '254 merely discloses an over-pressure relief valve in which a valve member is reciprocable within an opening and has a first end with a part toroidal recess and an elastomeric O-ring retained in the recess. Gimby '254 lacks a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. In Gimby '245, there is a pair of radial openings 28 and 30 in the valve member 12.

Feinberg '959 merely discloses a valve checking device having a casing, a pair of tubular coupling members, a pair of tubular sleeve members positioned within the casing before the coupling members are screwed in place, and a pair of fluid discharge orifices formed in the side walls of the sleeve members. Feinberg '959 lacks a fuel pump including a valve housing disposed in an outlet member, a valve seat formed on an interior surface of the valve housing, a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end, and a seal disposed in the groove for contacting the valve seat. Feinberg '959 also lacks a fuel pump including a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat. Feinberg '959 further lacks a fuel pump including a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when

the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position.

Gakenholz '243 merely discloses a fuel pump having a valve in a flange fitting of a housing member. Gakenholz '243 lacks a fuel pump including a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. In Gakenholz '243, there is no valve member with a single outlet port disposed below a groove thereof.

As to the level of ordinary skill in the pertinent art, Hutchings '356 merely discloses a check valve having a plurality of holes through a tubular portion a considerable distance from a valve cap. Gimby '254 merely discloses an over-pressure relief valve in which a valve member has a first end with a part toroidal recess and an elastomeric O-ring retained in the recess. Feinberg '959 merely discloses a valve checking device having a pair of tubular sleeve members positioned within a casing and a pair of fluid discharge orifices formed in the side walls of the sleeve members. Gakenholz '243 merely discloses a fuel pump having a valve in a flange fitting of a housing member. However, there is absolutely no teaching of a level of skill in the fuel pump art of a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. The Examiner may not, because he doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. See In re Warner, 379 F. 2d 1011, 154 U.S.P.Q. 173 (C.C.P.A. 1967). Thus, none of the references teaches a level of skill in the art of fuel pumps of a fuel

pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. As such, there is no suggestion or motivation in the art for combining Hutchings '356, Gimby '254, Feinberg '959, and Gakenholz '243 together.

It is not sufficient for an examiner merely to state that one reference teaches several of the limitations of a claim and another teaches several limitations of a claim to support a rejection based on obviousness. This approach ignores a cornerstone principal of patent law:

That all elements of an invention may have been old (the normal situation), or some old and some new, or all new, is however, simply irrelevant. Virtually all inventions are combinations and virtually are combinations of old elements. Environmental Designs v. Union Oil Co. of Cal., 713 F.2d 693, 698 (Fed. Cir. 1983) (other citations omitted).

Here, the Hutchings '356, Gimby '254, Feinberg '959, and Gakenholz '243 references, skirt around, but do not suggest the claimed invention *as a whole*. The analysis advanced by the Examiner here focuses on the obviousness of substitutions and differences instead of on the invention, *as a whole*, and is an over- simplification of the difficult determination of obviousness. See, Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1383 (Fed. Cir. 1986). Further it is respectfully submitted that the Examiner is picking and choosing elements from the structurally dissimilar devices disclosed in the Hutchings '356, Gimby '254, Feinberg '959, and Gakenholz '243 patents and combining these elements by restructuring them, using hindsight and the Applicant's own disclosure, to conclude that the claimed invention is obvious. This is improper. There is a fundamental axiom in patent law that if a reference must be reconstructed or rearranged to change its operation to meet the Applicant's claim, that modification of the reference is inappropriate and cannot stand. Furthermore,

obviousness is not established by combining the basic disclosures of the prior art to produce the claimed invention absent a teaching or suggestion that the combination be made. Interconnect Planning Corp. v. Fiel, 774 F.2d 1132, 1143, 227 U.S.P.Q. (BNA) 543, 551 (Fed. Cir. 1985); In re Corkhill, 771 F.2d 1496, 1501-1502, 226 U.S.P.Q. (BNA) 1005, 1009-10 (Fed. Cir. 1985).

Even if these references could be combined, neither teaches a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. Applicant is not attacking the references individually, but is clearly pointing out that each reference is deficient and, if combined (although Applicant maintains that they are not combinable), the combination is deficient.

As disclosed in the Background of the Invention section of the present application, eddy currents tend to create a low pressure on one side of a pintel of a check valve having two outlet ports being opposed or 180 degrees apart. This low-pressure area causes the pintel to tip toward this low pressure. Once the pintel moves toward the low-pressure area, the low-pressure area alternates to the opposite side of the pintel. This causes the pintel to immediately move back one hundred eighty degrees (180°) from its original direction of travel. As a result, the pintel is constantly trying to reach positional equilibrium, causing the pintel to oscillate and produce objectionable noise. This unique problem was solved by Applicant by providing a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position.

The references, if combinable, fail to teach or suggest the combination of a fuel pump including an outlet member having a first passageway therethrough, a valve housing disposed in the first passageway of the outlet member, a valve seat formed on an interior surface of the valve housing and having a generally frusta-conical cross-sectional shape, a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove, a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat, the valve member having a single outlet port disposed below the groove and located axially between the valve seat and the one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow when the valve member is in the open position as claimed by Applicant.

Further, the CAFC has held that “[t]he mere fact that prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification”. In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). The Examiner has failed to show how the prior art suggested the desirability of modification to achieve Applicant’s invention. Thus, the Examiner has failed to establish a case of prima facie obviousness.

The present invention sets forth a unique and non-obvious combination of a fuel pump including a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. Advantageously, the fuel pump includes a check valve having a mono-port on the pintel, which reduces oscillations and objectionable noise.

Obviousness under § 103 is a legal conclusion based on factual evidence (In re Fine, 837 F.2d 1071, 1073, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988), and the subjective opinion of the Examiner as to what is or is not obvious, without evidence in support thereof, does not suffice. Since the Examiner has not provided a sufficient factual basis which is supportive of his position (see In re Warner, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173, 178 (C.C.P.A. 1967), cert. Denied, 389 U.S. 1057 (1968)), the rejection of claims 11 through 15, 17, and 18 is improper.

Against this background, it is submitted that the present invention of claims 11 through 15, 17, and 18 is not obvious in view of a proposed combination of Hutchings '356, Gimby '254, Feinberg '959, and Gakenholz '243. The references fail to teach or suggest the combination of the fuel pump of claims 11 through 15, 17, and 18. Therefore, it is respectfully submitted that claims 11 through 15, 17, and 18 are not obvious and are allowable over the rejection under 35 U.S.C. § 103.

The law is clear that a claim in dependent form shall be construed to incorporate by reference all of the limitations of the claim to which it refers. 35 U.S.C. § 112, ¶ 4. Dependent claims 12 through 15, 17, and 18 perfect and further limit independent claim 11. Claim 12 claims the valve housing having a second passageway extending axially therethrough to receive the valve member. Claim 13 claims the valve housing having an enlarged opening at one end of the second passageway. Claim 14 claims the valve member having a flow port extending axially into one end thereof. Claim 15 claims the outlet port extending radially through the valve member and communicating with the flow port. Claim 17 claims the spring as a coil spring. Claim 18 claims the seal made of an elastomeric material. Based on the above, it is respectfully submitted that claims 12 through 15, 17, and 18 are not obvious and are allowable over the rejection under 35 U.S.C. § 103.

Claims 19 and 20

Independent claim 19 claims the present invention as a fuel pump including a pump section at one axial end, a motor section adjacent the pump section, and an outlet section adjacent the motor section at the other axial end. The outlet section includes an outlet member having a passageway therethrough, a valve housing disposed in the passageway of the outlet member, and a valve seat formed on an interior surface of the valve housing and having a generally frusta-conical cross-sectional shape. The fuel pump also includes a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end and including a seal disposed in the groove. The valve member has a flow port extending axially from an inlet into one end thereof. The fuel pump includes a spring disposed about the valve member and located between the inlet and the valve seat to urge the valve member toward the valve seat in a closed position in which the seal engages the valve seat to prevent fuel from flowing through the outlet member. The valve member has a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member.

As to the differences between the prior art and the claims at issue, the primary reference to Hutchings '356 merely discloses a check valve having a plurality of holes through a tubular portion a considerable distance from a valve cap and a fibre washer which forms a free passage for the fluid within the tubular portion to enter the interior of a valve casing when the valve is in a considerable open position. Hutchings '356 lacks a fuel pump with a valve seat

having a generally frusta-conical cross-sectional shape. Hutchings '356 also lacks a valve member with a single outlet port extending diametrically therethrough and communicating with a flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member. In Hutchings '356, a valve casing 6 is provided at each end with screw threads to receive an outer member 7 of the unions whose inner members 8 are screwed to the end of pipes 9 and a movable valve is clamped between the inner member 8 of the union and the end of the valve casing 6 and not disposed in an outlet member of a fuel pump.

Gimby '254 merely discloses an over-pressure relief valve in which a valve member is reciprocable within an opening and has a first end with a part toroidal recess and an elastomeric O-ring retained in the recess. Gimby '254 lacks a fuel pump having a valve member with a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member. In Gimby '245, there is a pair of radial openings 28 and 30 in the valve member 12.

Feinberg '959 merely discloses a valve checking device having a casing, a pair of tubular coupling members, a pair of tubular sleeve members positioned within the casing before the coupling members are screwed in place, and a pair of fluid discharge orifices formed in the side walls of the sleeve members. Feinberg '959 lacks a fuel pump including a valve housing disposed in an outlet member, a valve seat formed on an interior surface of the valve housing, a valve member disposed in the valve housing and having an end adjacent the valve seat with an

annular groove having a generally circular cross-sectional shape extending radially into the end, and a seal disposed in the groove for contacting the valve seat. Feinberg '959 also lacks a fuel pump including a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat. Feinberg '959 further lacks a fuel pump including a valve member with a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member. In Feinberg '959, a pair of springs 33, 34 are disposed axially on the opposite side of the valve seat of the sleeve members 28,29 from the discharge orifices 35,36 to reduce or prevent the oscillations and the discharge orifices 35,36 do not stop oscillations.

Gakenholz '243 merely discloses a fuel pump having a valve in a flange fitting of a housing member. Gakenholz '243 lacks a fuel pump including a valve member with a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member. In Gakenholz '243, there is no valve member with a single outlet port disposed below a groove thereof.

As to the level of ordinary skill in the pertinent art, Hutchings '356 merely discloses a check valve having a plurality of holes through a tubular portion a considerable distance from a valve cap. Gimby '254 merely discloses an over-pressure relief valve in which a

valve member has a first end with a part toroidal recess and an elastomeric O-ring retained in the recess. Feinberg '959 merely discloses a valve checking device having a pair of tubular sleeve members positioned within a casing and a pair of fluid discharge orifices formed in side walls of the sleeve members. Gakenholz '243 merely discloses a fuel pump having a valve in a flange fitting of a housing member. However, there is absolutely no teaching of a level of skill in the fuel pump art of a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. The Examiner may not, because he doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. See In re Warner, 379 F. 2d 1011, 154 U.S.P.Q. 173 (C.C.P.A. 1967). Thus, none of the references teaches a level of skill in the art of fuel pumps of a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. As such, there is no suggestion or motivation in the art for combining Hutchings '356, Gimby '254, Feinberg '959, and Gakenholz '243 together.

Even if these references could be combined, neither teaches a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. Applicant is not attacking the references individually, but is clearly pointing out that

each reference is deficient and, if combined (although Applicant maintains that they are not combinable), the combination is deficient.

As disclosed in the Background of the Invention section of the present application, eddy currents tend to create a low pressure on one side of a pintel of a check valve having two outlet ports being opposed or 180 degrees apart. This low-pressure area causes the pintel to tip toward this low pressure. Once the pintel moves toward the low-pressure area, the low-pressure area alternates to the opposite side of the pintel. This causes the pintel to immediately move back one hundred eighty degrees (180°) from its original direction of travel. As a result, the pintel is constantly trying to reach positional equilibrium, causing the pintel to oscillate and produce objectionable noise. This unique problem was solved by Applicant by providing a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position.

The references, if combinable, fail to teach or suggest the combination of a fuel pump including a pump section at one axial end, a motor section adjacent the pump section, an outlet section adjacent the motor section at the other axial end, the outlet section including an outlet member having a passageway therethrough, a valve housing disposed in the passageway of the outlet member, a valve seat formed on an interior surface of the valve housing and having a generally frusta-conical cross-sectional shape, a valve member disposed in the valve housing having a flow port extending axially from an inlet into one end thereof, a spring disposed about the valve member and located between the inlet and the valve seat to urge the valve member toward the valve seat in a closed position, the valve member having a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the

valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member as claimed by Applicant.

The present invention sets forth a unique and non-obvious combination of a fuel pump including a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. Advantageously, the fuel pump includes a check valve having a mono-port on the pintel, which reduces oscillations and objectionable noise.

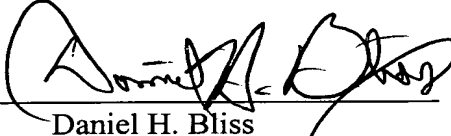
Against this background, it is submitted that the present invention of claims 19 and 20 is not obvious in view of a proposed combination of Hutchings '356, Gimby '254, Feinberg '959, and Gakenholz '243. The references fail to teach or suggest the combination of the fuel pump of claims 19 and 20. Therefore, it is respectfully submitted that claims 19 and 20 are not obvious and are allowable over the rejection under 35 U.S.C. § 103.

The law is clear that a claim in dependent form shall be construed to incorporate by reference all of the limitations of the claim to which it refers. 35 U.S.C. § 112, ¶ 4. Dependent claim 20 perfects and further limits independent claim 19. Claim 20 claims the valve member having a flow port extending axially into one end thereof and the outlet port extending radially through the valve member and communicating with the flow port. Based on the above, it is respectfully submitted that claim 20 is not obvious and is allowable over the rejection under 35 U.S.C. § 103.

CONCLUSION

In conclusion, it is respectfully submitted that the rejection of claims 11 through 15 and 17 through 20 is improper and should be reversed.

Respectfully submitted,

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CLAIMS APPENDIX

11. A fuel pump comprising:

an outlet member having a first passageway therethrough;

a valve housing disposed in said first passageway of said outlet member;

a valve seat formed on an interior surface of said valve housing and having a generally frusta-conical cross-sectional shape;

a valve member disposed in said valve housing and having an end adjacent said valve seat with an annular groove having a generally circular cross-sectional shape extending radially into said end and including a seal disposed in said groove, said valve member having a closed position in which said seal engages said valve seat to prevent fuel from flowing through said outlet member and an open position to allow fuel to flow through said outlet member;

a spring disposed about said valve member and located axially between said valve seat and one end of said valve housing to urge said valve member toward said valve seat; and

said valve member having a single outlet port disposed below said groove and located axially between said valve seat and the one end of said valve housing when said valve member is in said closed position to prevent fuel flow and to allow fuel flow when said valve member is in said open position.

12. A fuel pump as set forth in claim 11 wherein said valve housing has a second passageway extending axially therethrough to receive said valve member.

13. A fuel pump as set forth in claim 11 wherein said valve housing has an enlarged opening at one end of said second passageway.

14. A fuel pump as set forth in claim 11 wherein said valve member has a flow port extending axially into one end thereof.

15. A fuel pump as set forth in claim 14 wherein said outlet port extends radially through said valve member and communicates with said flow port.

17. A fuel pump as set forth in claim 11 wherein said spring comprises a coil spring.

18. A fuel pump as set forth in claim 11 wherein said seal is made of an elastomeric material.

19. A fuel pump comprising:
a pump section at one axial end;
a motor section adjacent said pump section;
an outlet section adjacent said motor section at the other axial end, said outlet section including an outlet member having a passageway therethrough;
a valve housing disposed in said passageway of said outlet member;
a valve seat formed on an interior surface of said valve housing and having a generally frusta-conical cross-sectional shape;

a valve member disposed in said valve housing and having an end adjacent said valve seat with an annular groove having a generally circular cross-sectional shape extending radially into said end and including a seal disposed in said groove;

said valve member having a flow port extending axially from an inlet into one end thereof;

a spring disposed about said valve member and located between said inlet and said valve seat to urge said valve member toward said valve seat in a closed position in which said seal engages said valve seat to prevent fuel from flowing through said outlet member; and

said valve member having a single outlet port extending diametrically therethrough and communicating with said flow port and located axially between said valve seat and one end of said valve housing when said valve member is in said closed position to prevent fuel flow and to allow fuel flow from said outlet port when said valve member is in an open position to allow fuel to flow through said outlet member.

20. A fuel pump as set forth in claim 19 wherein said valve member has a flow port extending axially into one end thereof and said outlet port extends radially through said valve member and communicates with said flow port.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None